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Division of Forensic Science	Amendment Designator:
FIREARM/TOOLMARK TRAINING MANUAL	Effective Date: 13 May 2003

4 FIREARMS AND AMMUNITION DEVELOPMENT AND CURRENT TRENDS	
4.1 Assignments	
4.1.1 Review the history of early firearms and ammunition development up to the advent of metallic cartridges, with particular emphasis on lock mechanisms, early rifling techniques, percussion systems, priming methods and pre-metallic cartridges. Prepare a chronological outline of this early development and discuss it with the Training Officer. <i>(Use Training Assignment #3 to complete this objective.)</i> _____ Training Officer _____ Date	
4.1.2 Visit the firearm collection of a museum in the region and observe first-hand those firearms that constitute examples of early firearms and ammunition development. Meet the curator of the collection and obtain their views and opinions on those firearms that are developmental benchmarks. Coordinate this tour with the Training Officer and be prepared to discuss the tour afterwards. _____ Training Officer _____ Date	
4.1.3 Tour the firearms reference collection noting in particular the types of firearms that are representative of commercial and military firearm development since the advent of metallic cartridges. _____ Training Officer _____ Date	
4.1.4 Trace the evolution of the rimfire cartridge from the mid-nineteenth century to the current generation of modern .22 caliber rimfire cartridges. <i>(Use Training Assignment #4 to complete this objective.)</i> _____ Training Officer _____ Date	
4.1.5 Study the history of centerfire cartridge development starting with black powder cartridges to the current generation of modern centerfire cartridges. Make notes to show the chronological history of this development and discuss these with your Training Officer. <i>(Use Training Assignment #5 to complete this objective.)</i> _____ Training Officer _____ Date	

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4.1.6	Study the Firearm Section Standard Ammunition File (SAF), noting in particular cartridges and shotshells that are representative of commercial and military ammunition development during the past three decades.	
	_____ Training Officer	_____ Date
4.1.7	Conduct an in depth study of exterior bullet coatings which have been developed in the last decade. Prepare a report concerning how this new technology impacts the firearm examiner.	
	<i>(Use Training Assignment #5 to complete this objective.)</i>	
	_____ Training Officer	_____ Date
4.1.8	Obtain a copy of the (most recent) studies concerning cartridge effectiveness conducted by the FBI. Prepare a report listing trends unfolding in cartridge and bullet development and show any historical significance to these findings.	
	_____ Training Officer	_____ Date
4.1.9	Prepare an overview of the recent development in handguns and how this information might be of significance to the firearm examiner.	
	_____ Training Officer	_____ Date
4.2	Reference Materials History of Black Powder as A Propellant	
	The following reference materials serve several purposes:	
	<ul style="list-style-type: none"> to provide a wider range of resources to provide reference materials for future professional use to allow you to gain additional depth in particular subject areas 	
	Additional references in this category should be added to notes and at the end of this listing.	
4.2.1	Books	
	Barnes, <u>Cartridges of the World</u>	
	Davis, T.L., <u>The Chemistry of Powder and Explosives</u> , reprinted by Angriff Press, Las Vegas, NV (Originally printed as two separate volumes in 1941 and 1943; also reprinted by John Wiley and Sons, New York, 1950.) pp. 1-51.	
	Munhall and White, <u>Cartridge Headstamp Guide</u>	

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<p>4.2.2 Periodicals</p> <p>Brown, M., "America's Gunpowder Maker," <u>American Rifleman</u>, Aug. 1979, pp. 40-43, 81</p> <p>Harrison, E.H., "Black Powder," <u>American Rifleman</u>, Oct. 1975, p.73.</p> <p>Lewis, R.B., "Bacon's Thunderous Sound," <u>American Rifleman</u>, May 1952, pp. 35-40.</p> <p>Ley, W., "Friar Berthold...Man or Myth," <u>American Rifleman</u>, Jul. 1959, pp. 31-34.</p> <p>Nonte, G.C., "At Last a Black Powder Substitute" in <u>Hogdon's Data Manual No. 23</u>, Hogdon Powder Co., Shawnee Mission, KS, 1977.</p> <p>"Pyrodex Replica Black Powder," <u>Rifle Magazine</u>, No. 46, p. 18.</p> <p>Roberts, D., "Dupont - Powder Supplier for a Nation," <u>Rifle Magazine</u>, Jul./Aug. 1973, pp. 36-37, 54.</p> <p>Silva, E., "The Black Powder Saga," <u>Guns Magazine</u>, Aug./Sep. 1977</p> <p>4.2.3 AFTE Journal</p> <p>Dillon, J.H., "Black Powder Background," 1991; 23(2):689-693.</p> <p>Garland, P.V., "The Augusta Powder Works - A Historical Sketch," 1974; 6(2):8-10.</p> <p>Rosenberg, S.F., "Good News for the Charcoal Burners, New Source for Black Powder, 1974; 6(2):13.</p> <p>Styers, G.R., "History of Black Powder," 1987; 19(4):443-446.</p> <p>4.2.4 Videotapes</p> <p><u>Kaboom!</u> , NOVA/WGBH Boston, 1997. (first twenty minutes)</p> <p>4.3 Reference Materials Evolution of Early Firearms</p> <p>4.3.1 Books</p> <p>Association of Firearm and Tool Mark Examiners Standardization Committee, <u>Glossary of the Association of Firearm and Tool Mark Examiners (Appendix F, Firearm Ignition Systems)</u>, 3rd edition, Available Business Printing, Inc., Chicago, 1994.</p> <p>Carman, <u>History of Firearms from Earliest Times to 1914</u></p> <p>Chapel, C.E., <u>Guns of the Old West</u>, Coward-McCann, Inc., New York, 1961. (Reprinted by Odysseus Editions, Inc., for the NRA Firearms Classics Library, 1995)</p> <p>Edwards, <u>Civil War Guns</u></p> <p>Fuller, C.E. and Stewart, R.D., <u>Firearms of the Confederacy</u>, Standard Publications, Inc., Huntington, WV, 1944. (Reprinted by Odysseus Editions, Inc., for the NRA Firearms Classics Library, 1996)</p>	

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<p>Gluckman, <u>U.S. Martial Pistols and Revolvers</u></p> <p>Greener, W.W., <u>The Gun and Its Development</u>, Cassel and Company, Ltd., New York, 1910. (Reprinted by Bonanza Books, 1967, and by Odysseus Editions, Inc., for the NRA Firearms Classics Library, 1995)</p> <p>Held, R., <u>The Age of Firearms - A Pictorial History</u>, Harpers, 1957.</p> <p>Hogg, I.V., <u>The Story of the Gun from Matchlock to M16</u>, St. Martin's Press, New York, 1996.</p> <p>Lewis, <u>Small Arms and Ammunition in the U.S. Service, 1776-1865</u></p> <p>Logan, H.C., <u>Hand Cannon to Automatic</u>, Standard Publications, Inc., Huntington, WV, 1944.</p> <p>NRA Staff, <u>Firearms and Ammunition Fact Book</u></p> <p>NRA, <u>Handgun and Shoulder Arms Assembly</u></p> <p>Peterson, H.L., <u>Arms and Armour in Colonial America 1526-1783</u>, The Stackpole Co., Harrisburg, PA, 1956.</p> <p>Peterson, H.L., <u>Encyclopedia of Firearms</u></p> <p>Pope, <u>Guns</u></p> <p>Roberts, N.H., <u>The Muzzle-loading Cap Lock Rifle</u>, The Clarke Press, Manchester, NH, 1944. (Reprinted by Odysseus Editions, Inc., for the NRA Firearms Classics Library, 1996)</p> <p>Sharpe, P.B., <u>The Rifle in America</u>, William Morrow and Co., New York, 1938. (Reprinted by Odysseus Editions, Inc., for the NRA Firearms Classics Library, 1995)</p> <p>Smith, W.H.B., <u>The NRA Book of Small Arms: Volume II - Rifles</u>, NRA/Military Service Publishing Company, Harrisburg, PA, 1948. (Reprinted by Palladium Press for the NRA Firearms Classics Library, 1997)</p> <p>Smith, W.H.B., <u>The NRA Book of Small Arms: Volume I - Pistols and Revolvers</u>, NRA/Military Service Publishing Company, Harrisburg, PA, 1946. (Reprinted by Palladium Press for the NRA Firearms Classics Library)</p> <p>U.S. Cartridge Company, <u>Pictorial History of Firearms to 1905</u>, Normount Technical Publications, Forest Grove, OR, 1971.</p> <p>Winant, L., <u>Early Percussion Firearms</u>, Morrow Publications, 1959.</p> <p>4.3.2 Periodicals</p> <p>Peterson, H.L., "The Development of Firearms," <u>American Rifleman</u>, Parts 1 and 2, Mar. and Apr., 1960.</p> <p>4.3.3 AFTE Journal</p> <p>Cayton, J.C., "Blackpowder Firearms, Powder Residue & Ball Penetration," 1984; 16(4):80.</p>	

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<p>Fadala, S., "Penetration of Round Ball," 1988; 20(2):135-139.</p> <p>George, W., "Black Powder Firearms: Safety Precautions," 1988; 20(1):57-58.</p> <p>Tschappat, M.G., "Early History of the Ordnance Department," 1988; 20(2):174-184.</p> <p>Vandiver, J.V., "Foxfire 5 Has Early Gunsmithing Data," 1981; 13(2):15.</p> <p>4.3.4 Videotapes</p> <p><u>Gunsmith of Williamsburg</u>, The Colonial Williamsburg Foundation, Williamsburg, VA, 1969.</p> <p><u>Guns of the Civil War</u>, Volumes I & II, Monterey Movie Co., 1993.</p> <p><u>The History of Firearms - The Springfield Armory</u>, United States Video Corp., Vienna, VA, 1994.</p> <p><u>Muzzle-Loading Basics, Flintlock and Percussion Firearms</u>, Lenny Magill Productions, San Diego, CA.</p> <p><u>The Story of the Gun</u>, Volume I and first 38 minutes of Volume II, up to but not including the development of rimfire ammunition, A&E Television Networks, New York, 1996.</p> <p style="text-align: right;">◆ End</p>	